Geophysical Research Abstracts
Vol. 17, EGU2015-14497-1, 2015
EGU General Assembly 2015

The tsunami from the 3500BP eruption of Santorini: new perspectives

David Tappin (1) and Paraskevi Nomikou (2)

(1) British Geological Survey, Marine Geology, Nottingham, United Kingdom (drta@bgs.ac.uk), (2) Faculty of Geology and Geoenvironment, University of Athens, Athens, Greece

Huge caldera-forming ignimbrite eruptions are well studied and, from historical events, are increasingly better understood. Yet although the potential volcanic impacts of these eruptions are known, their hazard from tsunami generation is still poorly researched. The eruption of Krakatau in 1883 is one of the most devastating events of historical times. The eruption was spectacular, with a lateral blast or hot pyroclastic surge killing a 1,000 people on the adjacent coast of south Sumatra. Yet it was the 30-40 m high tsunami that devastated the adjacent coastlines and killed many more people than the blast/surge; estimated at over 36,000 by the Dutch authorities, but possibly up to 120,000.

The Late Bronze Age (LBA), eruption of Santorini volcano in the southern Aegean is in many respects strikingly similar to the eruption of Krakatau, but no significant evidence for a major, possibly devastating, tsunami has yet been identified from nearby coastlines. Recent offshore research reveals the eruption to be much larger in volume than previously believed. At five times the volume of Krakatau, it is now possibly the largest eruption of the Holocene. The final phases of the Santorini eruption may now involve massive collapse of a volcanic pile that makes the generation of a regionally destructive tsunami much more feasible than previously believed. Archaeotsunami deposits on the east coast of Crete, an island located 100 km south of Santorini, support possible tsunami impact.

Based on the revised eruption volume and new models of the eruption, together with recent and new evidence of a tsunami on Crete, we here consider the likelihood that there was indeed a devastating tsunami from the Santorini eruption. On the north coast, coring at two coastal marshes reveals marine sands buried several metres below the land surface. At Malia the sands are dated at approximately 3,500BP. 100 km to the west of Malia, at Delphinos, there are marine sands dated at 2,800BP, although the younger date here may be attributable to the nature of the material dated. Deposits at both sites are associated with pumice. Although the site at Malia is close to the sea, the site at Delphinos is 340 m inland from the coast, far beyond the reach of storm waves.

The results we present here are preliminary, one a pilot study for a research proposal, but suggest that previous research that found no evidence of a tsunami on Crete and carried out almost 20 years ago, should be reconsidered. With large populations living near the sea in close proximity to active volcanoes there is a pressing requirement to better understand the tsunami hazard from eruption mechanisms. A devastating tsunami from the LBA eruption has major implications for mitigating the impacts from tsunami in the Aegean region and this presentation is a step towards addressing this possibility.